Parallel High Performance Computer Graphics Facility

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FUNCTION: The Laboratory for Computational Physics and Fluid Dynamics (LCP&FD) computer systems are available round-the-clock for computational studies in the fields of compressible and incompressible fluid dynamics, reactive flows, fluid-structure interaction (including submarine, ship, and aerospace applications), plasma physics, atmospheric and solar magnetoplasma dynamics, application of parallel processing to large-scale problems such as unstructured grid generation for complex flows, and other disciplines of continuum and quantum computational physics.

INSTRUMENTATION: The computer systems comprise a 64 R12K processor SGI Origin 2000, two parallel processing systems in classified environments, an eight R12K processor Origin, an 18 R10K processor Power Challenge, and a six R8K processor PowerOnyx. The HP Exemplar systems consist of a 64-processor X-Class SPP system and a 16-processor S-Class SPP system. The Alpha cluster is a collection of 21264-processor Linux systems well coupled with Myrinet high-speed switched interconnects. Each system has on the order of 200 GB of disk for storage during a simulation and at least 256 MB of memory per processor.

DESCRIPTION: The facility is used to develop and maintain state-of-the-art analytical and computational capabilities in fluid dynamics and related fields of physics, to establish in-house expertise in parallel processing and on-line graphical rendering for large-scale scientific computing, to perform analyses and computational experiments on specific relevant problems, and to transfer this technology to new and ongoing projects through cooperative programs. LCP&FD maintains a very powerful collection of computer systems. There is currently a total of 136 parallel SGI processors, 80 parallel HP processors, 36 clustered Alpha processors, and several other support systems. In addition, there are over 50 Macintosh computers, most of which are capable of large calculations both independently and in parallel ad hoc clusters.

CONTACT:
K. Obenschain • Code 6440 • (202) 404-1063
LOCATION:
Bldg. 97, Rm. 108 • NRL, Washington, DC